

CLAIMS

1. Hydraulic control for a chamber fill and drain comprising:
a source of pressurized fluid;
a first valve having first, second and third ports, said first port
fluidly coupled to a first fluid line, said second port fluidly coupled to a
5 chamber, said third port fluidly coupled to a fluid exhaust line, said valve
having first and second positions, said first position effective to fluidly couple
said first port to said second port, said second position effective to fluidly
couple said second port to said third port; and,
a second valve having respective first, second and third ports, said
10 first port fluidly coupled to said pressurized fluid source, said second port
fluidly coupled to said first fluid line, said third port fluidly coupled to said
fluid exhaust line, said valve having first and second positions, said first
position effective to fluidly couple said first port to said second port, said
second position effective to fluidly couple said second port to said third port;
15 wherein said chamber is supplied with pressurized fluid when the
first and second valves are both in respective first positions, said chamber is
selectively exhausted of pressurized fluid through the fluid coupling of the
second and third ports of the first valve when said first valve is in the
respective second position and the second valve is in the respective first
20 position, and said chamber is selectively exhausted of pressurized fluid
through the fluid coupling of the second and first ports of the first valve, the
first fluid line, and the second and third ports of the second valve when said
first valve is in the respective first position and the second valve is in the
respective second position.
2. A hydraulic control as claimed in claim 1 wherein said chamber
is an apply chamber of a torque transmitting device.
3. A hydraulic control as claimed in claim 1 wherein said valves
are solenoid controlled spool valves.

4. A hydraulic control as claimed in claim 3 wherein said first valve comprises a variable bleed solenoid.

5. A hydraulic control as claimed in claim 1 further comprising a pressure sensor for sensing chamber fluid pressure.

6. Method for controlling a fill and drain cycle of a fluid chamber comprising:

filling said chamber by

- 5 a) providing pressurized fluid to a first valve,
- b) routing the pressurized fluid through the first valve to a second valve, and
- c) routing said pressurized fluid through said second valve to the fluid chamber; and,

draining said chamber by exhausting said fluid chamber by

10 invoking one of

- a) a first routing for pressurized fluid from the fluid chamber through the second valve directly to an exhaust destination, and
- 15 b) a second routing for pressurized fluid from the fluid chamber through the second valve to the first valve, and then through the first valve to the exhaust destination.

7. The method for controlling a fill and drain cycle of a fluid chamber as claimed in claim 6 further comprising sensing fluid pressure within said chamber and inferring therefrom valve faults.

8. The method for controlling a fill and drain cycle of a fluid chamber as claimed in claim 6 wherein draining the chamber is effected one cycle to the next by alternately invoking said first and second routings.

9. The method for controlling a fill and drain cycle of a fluid chamber as claimed in claim 8 wherein upon the failure of the chamber to drain via the invoked one of the first and second routings, invoking the other of the first and second routings.

10. Method for diagnosing valve faults in a hydraulic system, said hydraulic system including a controllable blocking valve and a controllable trim valve, said blocking valve effective in a first position to fluidly couple a pressurized fluid source to a fluid passage and in a second position to fluidly decouple the pressurized fluid source from the fluid passage, said trim valve effective in a first position to fluidly couple the fluid passage to a chamber and in a second position to fluidly decouple the fluid passage from the chamber, wherein said chamber is fluidly coupled to said pressurized fluid source when the blocking valve and trim valve are simultaneously in respective first positions, comprising:

providing an exhaust path for the fluid in the fluid passage through the first valve when the first valve is in the second position;

providing an exhaust path for the fluid in the chamber through the second valve when the second valve is in the second position;

subsequent to the blocking valve and trim valve being in respective first positions, performing one of

- a) commanding the first valve to its second position and diagnosing a fault with the first valve if the fluid in the chamber fails to exhaust properly, and
- b) commanding the second valve to its second position and diagnosing a fault with the second valve if the fluid in the chamber fails to exhaust properly.

11. The method for diagnosing valve faults in a hydraulic system as claimed in claim 10 wherein failure of chamber exhaust is detected by a higher than expected pressure condition with the chamber.

12. The method for diagnosing valve faults in a hydraulic system as claimed in claim 10 further comprising, subsequent to diagnosing a valve fault in one of the first and second valves, commanding the other of the first and second valves to its second position.

13. The method for diagnosing valve faults in a hydraulic system as claimed in claim 12 further comprising diagnosing a fault in the other of the first and second valves if the fluid in the chamber fails to exhaust properly subsequent to commanding the other of the first and second valves to its
5 second position.